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TOPEX/POSEIDON OCEANOGRAPHIC SATELLITE GETS NEW LEASE ON LIFE

Engineers have given the TOPEX/Poseidon oceanographic satellite a new lease on life by successfully switching the principal instrument onboard the ocean topography satellite to operate on its backup unit, extending the spacecraft's already unprecedented lifetime of monitoring ocean circulation patterns worldwide.

With the switch to a fresh altimeter, the highly productive TOPEX/Poseidon mission, which produced the accurate prediction of the globally destructive El Nino phenomenon of 1997-1998, could last for months or years to come. The satellite, launched in 1992, was originally designed to last three to five years. It will celebrate its seventh year of operation in August.

Last months, commands were sent to for the U.S.-French satellite to turn off its primary radar altimeter, which was showing signs of age, and activate the backup altimeter. Preliminary data from the satellite analyzed by the TOPEX/Poseidon team at NASA's Jet Propulsion Laboratory, Pasadena, CA, indicated that the backup instrument is operating smoothly.

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"Barring any unforeseen problems with data acquisition, we will continue to use the spare altimeter to provide global ocean topography data," said David Hancock III, altimeter instrument scientist at the NASA Goddard Space Flight Center's Wallops Flight Facility in Virginia, whose team is monitoring operational data from the joint NASA-Centre National d'Etudes Spatiales (CNES) satellite.

Pleased by the results, Dr. Philip Callahan, head of the calibration team at JPL, noted that his team is working hard to calibrate side B data to extend TOPEX/Poseidon's ability to record global ocean changes as subtle as 1 millimeter per year (0.04 inches per year) well into the new millennium. "This work is an excellent testing bed for cross calibration of TOPEX/Poseidon with its successor, JASON-1, which is scheduled for launch in May 2000," he said.

Until recently, the primary altimeter, designated as "side A," had been very successful at acquiring ocean topographic data, such as sea-surface heights and global maps of winds and waves, as well as other measurements detailing land and ice sheet topography. The satellite has been collecting this information for nearly seven years and has added a significant inventory of new science data to scientists' models of ocean circulation from an altitude of 1,336 kilometers (830 miles) above Earth.

Using the altimeter, TOPEX/Poseidon has been able to record billions of time-specific measurements of ocean and topography to an accuracy of approximately 3 centimeters (1.2 inches). An international team of scientists has used the data to study global climate changes and such phenomena as the El Nino warming pattern in the Pacific Ocean, which occurs about every two-to-seven years, and a reverse trend, known as La Nina, which seems to follow El Nino winters and cools large expanses of ocean water. Although side A of the altimeter is still operational, components have started to degrade from wear and tear on the satellite. The operations team expects to be able to side B of the altimeter for the next several years, but will be able to switch back to side A if necessary, Hancock said.

The Wallops Flight Facility Observational Science Branch, which is part of Goddard's Laboratory for Hydrospheric Processes, worked alongside the JPL science and engineering team to provide specifications for using the backup altimeter system. The team, in conjunction with members of Goddard's Applied Engineering and TechnologyDirectorate, Greenbelt, MD, was responsible for designing the fully qualified, backup altimeter, built by the Johns Hopkins Applied Physics Laboratory, Baltimore, MD.

The TOPEX/Poseidon mission is managed by the Jet Propulsion Laboratory for NASA's Office of Earth Science, Washington, DC. JPL is a division of the California Institute of Technology.

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